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Selecting ideal heat sources for heat pumps

Solar heat lowers the surface area requirement of ground collectors

The potential offered by improving the energy efficiency of heat pump systems is far from exhausted. The new BINE Projektinfo “Which heat sources are optimal for heat pumps” (06/2018) presents two such approaches.

Researchers at the Institute for Solar Energy Research in Emmerthal have developed a concept with which the surface area requirement of geothermal heat collectors can be reduced. The Institute for Building Services and Energy Design at TU Braunschweig has developed a new information and design tool for the early planning phase. It supports planners in selecting the ideal solution for a specific project from the wide range of available heat sources and heat exchangers.

Heat pump systems with horizontal ground collectors have a higher energy efficiency than systems using external air as heat source, but they also require large surface areas. With the concept created at ISFH, the area requirement can be lowered by about 50 %. To realise this, the network of collector pipes in the ground is laid more tightly. However, this increases the risk of critical frost conditions in the ground. Using solar heat from simple, unglazed solar absorbers, the soil can be thermally regenerated to counteract this. In an effort to analyse the concept with greater precision, the researchers, together with partners, have developed a simulation model for geothermal heat collectors and validated it experimentally using data from a prototype system. Parameter studies show how such hybrid systems are designed in an optimal way. The researchers in Braunschweig have developed a design and information tool in order to be able to select the suitable components for a ground source heat pump system faster and with a greater overall perspective during the initial phase of a project. The software contains a library with specifications of heat pumps and heat exchangers available on the market and it allows for a quick energetic and economic evaluation of system variants. The WPSOURCE tool will be available starting autumn 2018.

The BINE-Projektinfo brochure, which can be obtained free of charge from the BINE Information Service at FIZ Karlsruhe, is available online at www.bine.info or by calling +49 (0)228 92379-0. The brochure cover and additional image material can also be downloaded from this web portal in the press section.

Contact
Uwe Milles
presse@bine.info

BINE information service
Kaiserstraße 185-197
53113 Bonn
www.bine.info